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350. Proposed by V. M. SPUNAR, M. and E. E., Chicago, Ill.

Solve the equations:  $x+y+z=a_0$ ,  
 $x+yu+zv=a_1$ ,  
 $x+yu^2+zv^2=a_2$ ,  
 $x+yu^3+zv^3=a_3$ ,  
 $x+yu^4+zv^4=a_4$ .

### CALCULUS.

304. Proposed by H. C. FEEMSTER, York College, York, Neb.

Reduce  $axyp^2 + (x^2 - ay^2 - b)p - xy = 0$  to Clairaut's form, and hence solve the equation.

305. Proposed by C. N. SCHMALL, New York City.

Prove  $\int_{\beta}^x \frac{dx}{\sqrt{[(a-x)(x-\beta)]}} = 2\cos^{-1} \sqrt{\frac{a-x}{a-\beta}}$ . [Edwards' *Integral Calculus for Beginners*, p. 84, ex. 4.] Does this result hold when the upper limit is changed from  $x$  to  $a$ ?

### MECHANICS.

358. Proposed by W. J. GREENSTREET, M. A., Stroud, England.

Two heavy particles connected by a string, length  $l$ , lie one on each of two inclined planes with common horizontal edge and of angles  $\alpha$  and  $\beta$ . The inclination of the string to the edge varies as the inclination to the horizon of a simple pendulum of length  $l(\sin \alpha + \sin \beta)$ .

### NUMBER THEORY AND DIOPHANTINE ANALYSIS.

178. Proposed by PROFESSOR L. E. DICKSON, Ph. D., The University of Chicago.

Find a formula which gives all the integral solutions prime to 5 of the congruence  $y^2 + z^2 \equiv 0 \pmod{5^4}$ .

179. Proposed by V. M. SPUNAR, Chicago, Ill.

Solve the equation in integers,  $x^n + y^n + z^n + xyz = 100x + 10y + z$ .

180. Proposed by A. H. HOLMES, Brunswick, Maine.

Find integral values for  $x$  and  $y$  in the following:  $96x - 96y + 21 = \square$ .

### NOTES AND NEWS.

Dr. Arnold Emch, of Basel, Switzerland, has sailed for America and expects to assume his duties as Assistant Professor of Mathematics in the University of Illinois at the beginning of the second semester. Professor Emch is the author of numerous articles, which appeared in various journals

of Europe and America. In 1905 he published a book entitled "An Introduction to the Projective Geometry and its Applications," which has been favorably reviewed by Karl Doehlemann in *Zeitschrift für Mathematik und Physik*, Vol. 58 (1908), page 332; and also by Lothar Heffter in *Archiv der Mathematik und Physik*, Vol. 13 (1908), page 72. This book as well as the articles mentioned above deal, to a large extent, with the applications of mathematics to the problems of the engineer and the physicist. M.

The next regular meeting of the American Association for the Advancement of Science will be held at Washington, D. C., under the Presidency of Professor C. E. Bessey, University of Nebraska. At this meeting Professor E. H. Moore, University of Chicago, is expected to give his address as retiring Vice-President. Professor E. B. Frost, Director of Yerkes Observatory, was elected Vice-President and Chairman of Section A, during the recent Minneapolis Meeting of the Association. M.

A joint meeting of mathematicians and engineers was held during the holidays at Minneapolis, Minnesota, in connection with the convocation of the American Association for the Advancement of Science, to hear the report of the committee of twenty on the teaching of mathematics to students of engineering. Three years ago a similar meeting was held in Chicago through the Chicago Section of the American Mathematical Society. The Chicago meeting aroused much interest and resulted in the appointment of a committee of twenty, under the chairmanship of Professor E. V. Huntington, of Harvard University, to consider the whole question of the teaching of mathematics to students of engineering in this country, and to report its recommendations to the Society for the Promotion of Engineering Education at its summer meeting to be held at Madison, Wisconsin, in June, 1910.

In the early part of its investigation the committee collected a large amount of information in regard to the present status of mathematical instruction for engineering students. Since that time, however, a much more inclusive inquiry has been undertaken by the International Commission on the Teaching of Mathematics. In order to avoid unnecessary duplication, this committee voted to turn over all the results of its own inquiry in this field to the larger commission, to be worked up in accordance with the general scheme adopted by that commission, and to be incorporated in their report. This material is therefore not included in the present report.

Aside from the collection of data, Professor Huntington's committee decided that the most important need at the present time is a series of synoptical text-books, which shall present: (1) the fundamental principles of the science, in compact form, and (2) a classified and graded collection of problems (which would naturally be subject to continual change and expansion). It is their hope that the Minneapolis report, which is confined to the first part of the desired text-book, will stimulate throughout the country practical contributions toward the second. S.

Copies of these syllabi were distributed among the hundred or more engineers, physicists, and mathematicians who joined in a good fellowship dinner on the evening preceding the presentation of the report. Additional copies may be had upon request from the chairman. The following quotations from the preface will indicate its scope and purpose:

"The object of this report is to present a synopsis of those fundamental principles and methods of mathematics which, in the opinion of the committee, should constitute the minimum mathematical equipment of the student of engineering.

"It is hoped that this report may be serviceable in two ways: first, to the teacher, as an indication of where the emphasis should be laid; and secondly, to the student, as a syllabus of facts and methods which are to be his working tools. It does not include data for which the student would properly refer to an engineer's hand-book; it includes rather just those things for which he ought never to be obliged to refer to any book—the things which he should have constantly at his fingers' ends.

"The teacher of mathematics should see to it that at least these facts are perfectly familiar to all his students, so that the professor of engineering may presuppose, with confidence, at least this much mathematical knowledge on the part of his students. On the other hand, if the professor of engineering needs to use, at any point, more advanced mathematical methods than those here mentioned, he should be careful to explain them to his class.

"The defects in the mathematical training of the student of engineering appear to be largely in the knowledge and grasp of fundamental principles, and the constant effort of the teacher should be to ground the student thoroughly in these fundamentals, which are too often lost sight of in a mass of details.

"The order in which these topics should be taken up must be left largely to the discretion of the individual teacher. The committee is firmly of the opinion, however, that whatever order is adopted, the principal part of the course should be problems worked by the students, and that all these problems should be solved on the basis of a small number of fundamental principles and methods, such as are here suggested."

The report was freely discussed and frankly criticised by a large number of speakers, and the discussion finally led to the following resolution, which was unanimously adopted:

*Resolved*, That this body tenders hearty thanks to Professor Huntington for the great interest which he has shown in this work and the untiring service which he has given to it; that we commend the work of the entire committee for the preparation of a report which it is believed must operate for betterment along the lines of its recommendations; and while not prepared to approve in all respects the details, especially in the syllabus on dynamics, as shown by the full and free discussion at this meeting, yet we

heartily endorse the spirit of the report and thank the officers of the Society for the Promotion of Engineering Education, who have shown their friendly coöperation in offering to publish these syllabi in the official *Bulletin*, for the purpose of drawing out further criticisms and suggestions either in printed papers or in written communications to the chairman of the committee.

The further report of this committee is to be presented at the next meeting of the Society for the Promotion of Engineering Education in June, 1911. The present meeting was organized, as was the original meeting in Chicago in 1907, by the Chicago Section of the American Mathematical Society.

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## BOOKS AND PERIODICALS.

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*Engineering Descriptive Geometry.* A Treatise on Descriptive Geometry as the Basis of Mechanical Drawing, Explaining Geometrically the Operations Customary in the Draughting Room. By F. W. Bartlett, Commander United States Navy, Head of Department of Marine Engineering and Naval Construction at the United States Naval Academy, and Theodore W. Johnson, A. B., M. E., Professor of Mechanical Drawing, United States Naval Academy, Member of American Society of Mechanical Engineers. 8vo. Cloth, vi+159 pages. New York: John Wiley & Sons.

This work follows the plans of practical draughtsmen, in that it aims to make the subject of practical use rather than a subject for the mathematical student. Unlike the older works on the subject, but like the more modern texts, the object to be delineated is placed behind the vertical plane and below the horizontal plane. Use is also made of side planes. The book will be found useful in engineering courses. F.

*Elements of Plane Trigonometry.* A Text-Book for High Schools, Technical Schools, and Colleges. By Robert E. Moritz, Ph. D. (Neb), Ph. N. D. (Strassburg), Professor of Mathematics, University of Washington. First Edition, First Thousand. 8vo. Cloth, xvi+359 pages+91 pages of Tables. Price, \$2.00. New York: John Wiley & Sons.

The author believes that Trigonometry is college mathematics *par excellence* and therefore in this text aims to present the science in as simple and as attractive manner as possible. He aims to make the subject less technical, by introducing considerable historical matter, and by assuming that the student is unfamiliar with much of college algebra, and knows very little of the rudiments of mathematics. The author does not hesitate in the advanced part of the subject, to lay down the fundamental notions on which the whole structure rests. Thus in dealing with the Theorems of Demoivre and Euler no knowledge of imaginaries is assumed. The Hyperbolic Functions are treated in a separate chapter. Here, too, the analogies between them and the Circular Functions are pointed out.

The book is full of interesting material, and will be found very serviceable in the class-room. F.